

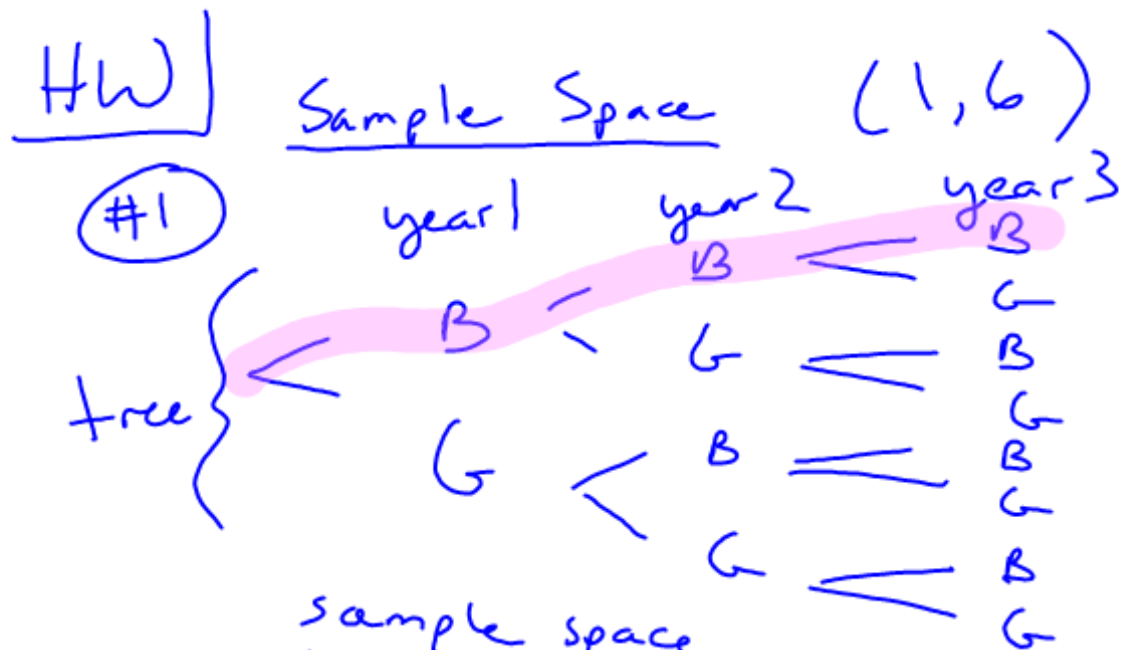
Warmup:

How many different license plates can the state of Colorado have using the standard Colorado license plate?

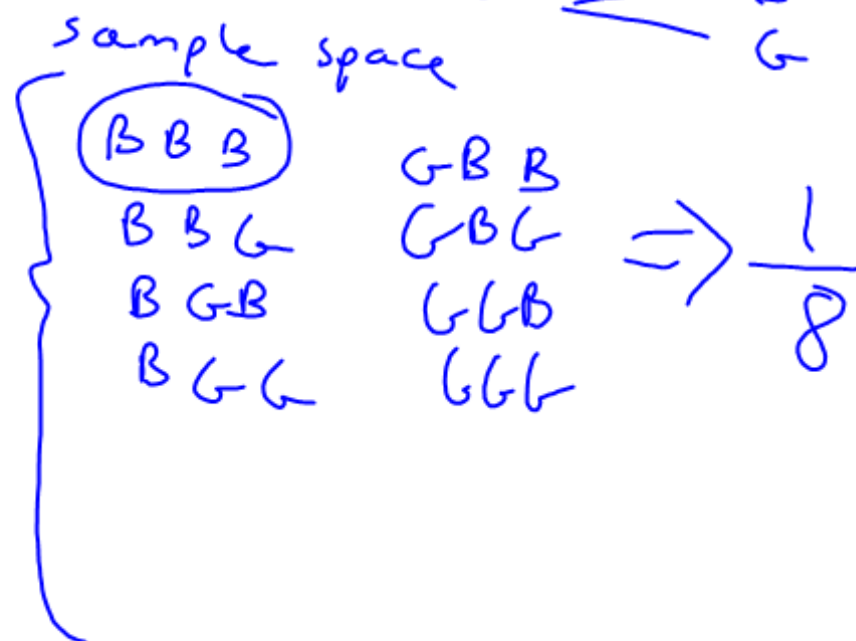
1 2 3 - A B C

$$10 \cdot 10 \cdot 10 \cdot 26 \cdot 26 \cdot 26$$

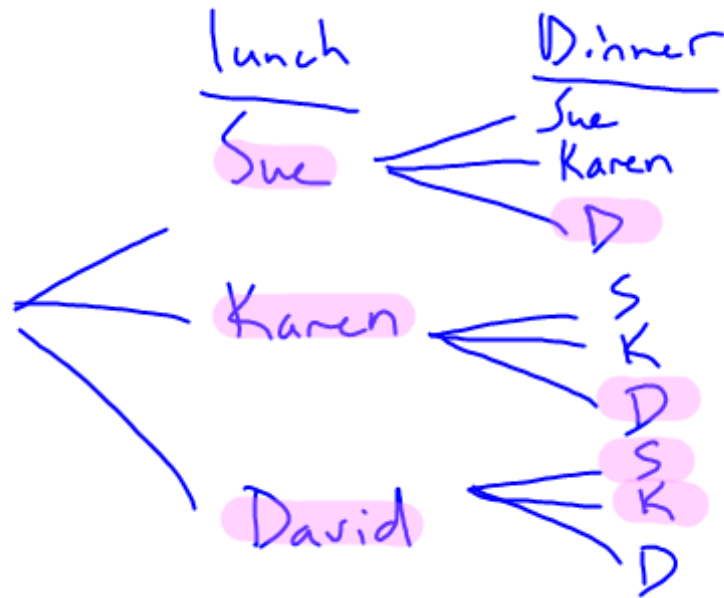
$$= \sim 17.6 \text{ million}$$



$$\frac{1 \text{ B,B,B}}{8 \text{ total}} = \frac{1}{8}$$



6



Mult. Counting Principle

⑤ Outfit: 1 shirt, 1 pant

Shirts

Pants

3 blue

5 denim

2 green

2 khaki

7 red

How many outfits?

$$12 \cdot 7 =$$

① 10

$$5 \cdot 4 = \frac{20}{2} = 10$$

Pin & Saus

$$2! = 2 \cdot 1 = 2$$

Saus & Pin

② 10

top1 top2 top3

$$5 \cdot 4 \cdot 3 = \frac{60}{6} = 10$$

pin, saus, onion

pin, onion, saus

Saus, onion, pin

Saus, pin, on

onion, pin, saus

onion, saus, pin

$$3! = 3 \cdot 2 \cdot 1 = 6$$

③ For Jonathan: $\overset{\text{top1}}{7} \cdot \overset{\text{top2}}{6} = \frac{42}{2!} = 21$

$7C_2$

For Johanna: $\overset{\text{top1}}{7} \cdot \overset{\text{top2}}{6} \cdot \overset{\text{top3}}{5} = \frac{7 \cdot 6 \cdot 5}{3! = 3 \cdot 2 \cdot 1} = 35$

$7C_3$

$11C_6 = \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 462$

$6C_5 = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2}{5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 6$

- 1) Baskin-Robbins advertises that they have 31 flavors. How many different 3 scoop cones can be made if each scoop is a different flavor and the order in which the flavors are placed on the cone matters; i.e. a chocolate, strawberry, vanilla cone is different than a strawberry, chocolate, vanilla cone? How many different 3 scoop bowls can be made if the order now does not matter?

$$\# \text{ cones} = 31 \cdot 30 \cdot 29$$

$$\# \text{ bowls} = \frac{31 \cdot 30 \cdot 29}{3!} = \frac{31 \cdot 30 \cdot 29}{6}$$